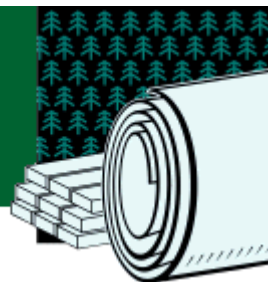


# FOREST PRODUCTS

## Project Fact Sheet



### ACCELERATED STEM GROWTH RATES AND IMPROVED FIBER PROPERTIES OF LOBLOLLY PINE

#### BENEFITS

- Increases growth rate of the woody stem and the yield of wood/acre
- Improves competitiveness of U.S. forest products companies
- Lowers cost of fiber
- Produces a more uniform supply of fiber
- Simplifies pulping (because of thinner-wall fibers)
- Decreases energy costs
- Requires no additional capital equipment

#### APPLICATIONS

The technology is complementary to all existing procedures and researchers predict it will occupy 100 percent of the market share. The first commercial plantings will occur between 2006–2009, with market saturation expected in 20–30 years.

#### Genetically Engineered Trees Will Ensure a Sustained Supply of High-Quality Materials for the U.S. Forest Products Industry

The demand for timber, pulp, and paper is expected to increase significantly over the next two decades. To meet this demand, the forestry industry must produce trees with larger woody stems which will require a better understanding of the molecular mechanisms that control tree growth.

Researchers at the Institute of Paper Science & Technology (IPST) are studying the genetic and biochemical regulation of physiological processes in trees. They have proposed cloning genes that regulate cell cycles in the vascular cambium of loblolly pines. This will provide foresters with the ability to genetically engineer trees that produce fibers faster and with thinner cell walls than those grown today.

The primary benefits of a successful research program will be the potential to improve forest productivity and an understanding of cell-growth regulation in the vascular cambium of trees.



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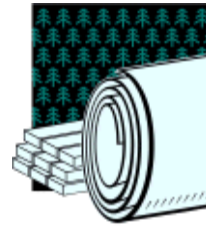
## PROJECT DESCRIPTION

**Goal:** To isolate genes that accelerate the rate of cambial cell divisions, producing trees with increased stem growth rates and an increased number of tracheids per volume of wood.

Researchers at IPST will use their expertise in performing tissue culture of pine cells to attempt to genetically transform loblolly pine tissue. Their working hypothesis is that auxin levels within the cambium regulate the expression of cyclin, which then controls the cell division cycle within the cambium. They will investigate whether the growth rate of the stem is increased by stimulating the rate of cambial cell divisions. Tests will be conducted to find a "promoter" gene that is active in stimulating the growth of cambial cells and of secondary growth that leads to more xylem cells with thinner secondary cell walls.

## PROGRESS & MILESTONES

- One measure of success will be the development of reagents to carry out detailed fundamental studies of mechanisms that regulate cambial cell divisions.
- A second milestone will be the creation of transgenic pines with increased stem growth rates.
- Tissue collections for RNA isolation and in-situ hybridizations are near completion.
- Partial length cDNA encoding was obtained and cDNA libraries have been constructed.
- Transformation efforts for *P. taeda* are ongoing.



### PROJECT PARTNERS

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